Form No. 10-306 (Rev. 10-74)

UNITED STATES DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE

NATIONAL REGISTER OF HISTORIC PLACES INVENTORY -- NOMINATION FORM

FOR FEDERAL PROPERTIES

FOR NPS USE ONLY
RECEIVED NOV 01 1979
DATE ENTERED APR 8 1981

SEE INSTRUCTIONS IN *HOW TO COMPLETE NATIONAL REGISTER FORMS*
TYPE ALL ENTRIES -- COMPLETE APPLICABLE SECTIONS

1 NAME

HISTORIC: Hoover Dam

AND/OR COMMON:

2 LOCATION

STREET & NUMBER: Located in the Black Canyon of the Colorado River on the Nevada-Arizona boundary. The dam is about 7 miles northeast of Boulder City.

__NOT FOR PUBLICATION

CITY, TOWN: Las Vegas — X VICINITY OF

CONGRESSIONAL DISTRICT: Ariz. #3 Nev. #1

STATE	CODE	COUNTY	CODE
Arizona	04	Mohave	015
Nevada	32	Clark	003

3 CLASSIFICATION

CATEGORY	OWNERSHIP	STATUS	PRESENT USE	
__DISTRICT	X PUBLIC	X OCCUPIED	__AGRICULTURE	__MUSEUM
__BUILDING(S)	__PRIVATE	__UNOCCUPIED	__COMMERCIAL	__PARK
X STRUCTURE	__BOTH	__WORK IN PROGRESS	__EDUCATIONAL	__PRIVATE RESIDENCE
__SITE	**PUBLIC ACQUISITION**	**ACCESSIBLE**	__ENTERTAINMENT	__RELIGIOUS
__OBJECT	__IN PROCESS	X YES: RESTRICTED	X GOVERNMENT	__SCIENTIFIC
	__BEING CONSIDERED	__YES: UNRESTRICTED	__INDUSTRIAL	__TRANSPORTATION
		__NO	__MILITARY	__OTHER:

4 AGENCY

REGIONAL HEADQUARTERS: *(If applicable)*
Bureau of Reclamation - Lower Colorado Region

STREET & NUMBER
1404 Colorado Street

CITY, TOWN
Boulder City —— VICINITY OF

STATE
Nevada 89005

5 LOCATION OF LEGAL DESCRIPTION

COURTHOUSE, REGISTRY OF DEEDS, ETC.: Bureau of Reclamation, Lower Colorado Region

STREET & NUMBER
1404 Colorado Street

CITY, TOWN
Boulder City, Nevada

STATE

6 REPRESENTATION IN EXISTING SURVEYS

TITLE
Draft of Description

DATE
8/9/79 __FEDERAL __STATE __COUNTY __LOCAL

DEPOSITORY FOR SURVEY RECORDS: Texas Tech University

CITY, TOWN
Lubbock

STATE
Texas

DESCRIPTION

CONDITION		CHECK ONE	CHECK ONE
X EXCELLENT	__DETERIORATED	X UNALTERED	X ORIGINAL SITE
__GOOD	__RUINS	__ALTERED	__MOVED DATE_____
__FAIR	__UNEXPOSED		

DESCRIBE THE PRESENT AND ORIGINAL (IF KNOWN) PHYSICAL APPEARANCE

DESCRIPTION

Hoover Dam is located in the Black Canyon on the Colorado River. The west wall of Black Canyon is in Clark County, Nevada, and the east wall is in Mohave County, Arizona. The dam is about 28 miles southeast of Las Vegas, Nevada and approximately 7 miles east of Boulder City, Nevada. The drainage area above Hoover Dam comprises 167,800 square miles including parts of the states of Wyoming, Utah, Colorado, Nevada, Arizona, and New Mexico. The Colorado River above Hoover Dam rises in the Rocky Mountains of Wyoming and Colorado and flows southwestward to Lake Mead for a distance of about 900 miles. Principal tributaries of the Colorado River that feed into Lake Mead are the Green, Yampa, White, Uinta, Duchesne, Price, San Rafael, Muddy, Fremont, Escalante, Gunnison, Dolores, San Juan, Little Colorado, and Virgin Rivers.

The construction of Hoover Dam began June 6, 1933 and was completed September 30, 1935, two years ahead of schedule. Hoover Dam is a concrete, arch-gravity storage dam. The water load in this type of dam is carried by both gravity action and horizontal action.

Through the courtesy of Wendell Bell, Manager of the History of Engineering Program, Texas Tech University, a description of Hoover Dam is as follows:

Hoover Dam is 1,244 feet long at the crest where U.S. Highway 93 surmounts it. Its maximum height is 726.4 feet as measured from the lowest point of the foundation rock to the crest. The dam is 660 feet thick at the base and tapers to 45 feet thick at the top. A total of 3.25 million cubic yards of concrete were used in the dam itself. Four diversion tunnels were built on each side of the river to drain the dam site. Each is a circular tunnel 50 feet in diameter and lined with three feet of concrete. The combined length of the tunnels is 15,946 feet. Since completion of the dam, these tunnels have been plugged, sealing off the upper portions while leaving the lower portions open to serve as spillways in the cases of the two outer tunnels and as penstocks in the cases of the two inner tunnels. The spillways were designed to carry 400,000 second-feet of water and include a concrete-lined 600-foot inclined tunnel leading to the diversion tunnels on each side. Gravity dams of overflow profile were constructed to serve as spillway weirs, and are 85 feet high on the Arizona side and 75 feet high on the Nevada side. Piers at quarter points on the crests of these overflow sections divide them into 100-foot sections for structural steel drum gates to control spillover. The spillway channels are 125 feet wide at the weir crest and 165 feet wide at the tunnel end. They include more than 127,000 cubic yards of concrete.

Four intake towers provide for release of stored water under normal conditions and control the flow to the canyon-wall and tunnel-plug outlet works and to the power-plant turbines. Each of the intake towers is constructed on a rock bench or shelf

SIGNIFICANCE

PERIOD	AREAS OF SIGNIFICANCE -- CHECK AND JUSTIFY BELOW				
_PREHISTORIC	_ARCHEOLOGY PREHISTORIC	_COMMUNITY PLANNING	_LANDSCAPE ARCHITECTURE	_RELIGION	
_1400-1499	_ARCHEOLOGY-HISTORIC	_CONSERVATION	_LAW	_SCIENCE	
_1500-1599	X AGRICULTURE	X ECONOMICS	_LITERATURE	_SCULPTURE	
_1600-1699	_ARCHITECTURE	_EDUCATION	_MILITARY	_SOCIAL/HUMANITARIAN	
_1700-1799	_ART	X ENGINEERING	_MUSIC	_THEATER	
_1800-1899	_COMMERCE	X EXPLORATION/SETTLEMENT	_PHILOSOPHY	_TRANSPORTATION	
X 1900-	_COMMUNICATIONS	_INDUSTRY	_POLITICS/GOVERNMENT	_OTHER (SPECIFY)	
		_INVENTION			

SPECIFIC DATES 6/6/33 - 9/30/35 BUILDER/ARCHITECT Six Companies, Inc. of ~~San Francisco, California~~

STATEMENT OF SIGNIFICANCE

Curbing the Colorado River by means of building Hoover Dam was the greatest task in hydraulic engineering that had been attempted since digging the Panama Canal.

The proposed dam to be built in the Black Canyon had to achieve several purposes: 1) to protect the low-lying valleys of Arizona and southern California from floods; 2) to store the annual spring runoff for later use; 3) to solve the problem of the vast amounts of sediment carried by the river; and 4) to provide power generation sufficient to assure repayment of the project. To achieve the goals stated above, a huge dam would have to be built. Hoover Dam was the highest dam in the world - 726.4 feet from bedrock to the crest. A structure of this height would create a reservoir large enough to store safely the normal flow of the river for 2 years. Measured by volume, such a reservoir for a number of years would be the largest artificial lake in the world. When filled to maximum, it would initially impound more than 31 million acre-feet of water. The dam also had to be large enough to trap and hold the millions of tons of sediment carried by the river every year and without seriously impairing its efficiency as a reservoir or interfering with the generation of power.

The proposed dam was of such magnitude that there was serious opposition and concern about the engineering expertise needed. Questions were raised concerning the possibility of the collapsing of the dam. Along with the engineering problems were other factors. The extreme remoteness of the dam site, the ruggedness of the terrain surrounding the site, and the extreme climatic conditions; summer temperatures of 125° in the canyon, cloud bursts, high winds and sudden floods all made the work difficult.

The equipment available for the job would appear very primitive for such an undertaking today. Any appraisal of the task should include evaluation of the equipment the task was conducted with.

9 MAJOR BIBLIOGRAPHICAL REFERENCES

The Story of Hoover Dam, Bureau of Reclamation

The Construction of Hoover Dam, Bureau of Reclamation

10 GEOGRAPHICAL DATA

ACREAGE OF NOMINATED PROPERTY 150

UTM REFERENCES

	ZONE	EASTING	NORTHING
A	11	704000	3988400
B	11	704600	3988150
C	11	703850	3987350
D	11	703650	3987550

VERBAL BOUNDARY DESCRIPTION

Section 29, T. 30 N., R. 65 E., and Section 3, T. 30 N., R. 23 W.

LIST ALL STATES AND COUNTIES FOR PROPERTIES OVERLAPPING STATE OR COUNTY BOUNDARIES

STATE	CODE	COUNTY	CODE
Arizona	04	Mohave	015
Nevada	32	Clark	003

11 FORM PREPARED BY

NAME / TITLE
Joan Middleton, Archeologist — 9/7/79

ORGANIZATION — DATE
Bureau of Reclamation — 293-8464

STREET & NUMBER — TELEPHONE
1404 Colorado Street

CITY OR TOWN — STATE
Boulder City, — Nevada

12 CERTIFICATION OF NOMINATION

STATE HISTORIC PRESERVATION OFFICER RECOMMENDATION

YES____ NO____ NONE____

STATE HISTORIC PRESERVATION OFFICER SIGNATURE

In compliance with Executive Order 11593, I hereby nominate this property to the National Register, certifying that the State Historic Preservation Officer has been allowed 90 days in which to present the nomination to the State Review Board and to evaluate its significance. The evaluated level of significance is _X_National ____State ____Local.

FEDERAL REPRESENTATIVE SIGNATURE

TITLE — DATE
Bureau Archeologist Commissioner of Reclamation

FOR NPS USE ONLY

I HEREBY CERTIFY THAT THIS PROPERTY IS INCLUDED IN THE NATIONAL REGISTER

DATE

DIRECTOR, OFFICE OF ARCHEOLOGY AND HISTORIC PRESERVATION

ATTEST: DATE

KEEPER OF THE NATIONAL REGISTER

excavated in the canyon wall and consists of an inner barrel 29 feet 8 inches in diameter surrounded by 12 radial buttresses, which accommodate the trashrack sections and support the barrel. The outer diameter of each tower tapers from 82 feet at the base to 63 feet 8-7/8 inches at the top, a parapet 342 feet above the base. The towers incorporate upper and lower gate openings with 12 openings each. These cylinder gates, 32 feet in diameter and 11 feet high, are raised and lowered over the openings, by electrically-operated stem hoists.

The two downstream intake towers are each connected by a header tunnel to the canyon-wall outlet works. Each of the tunnels is 41 feet in diameter and lined with 24 inches of concrete. Each is connected by four 21-foot diameter tunnels to the powerplant turbines. Downstream from the 41-foot tunnels, the header tunnels are each connected to the canyon-wall outlet works by six 11-foot horseshoe tunnels filled with concrete.

The two upstream intake towers are connected with the inner diversion tunnels by 41-foot diameter inclined tunnels lined with 24 inches of concrete. These inner diversion tunnels are now filled with concrete. These inclined tunnels are each connected to the powerplant turbines by four 21-foot penstock tunnels.

The tunnels carry a system of steel plate pipes constructed by Babcock and Wilcox Company of Barberton, Ohio. These are composed of four 30-foot diameter headers, four branch penstocks 13 feet in diameter leading from each header to the turbines, and a 25-foot header leading beyond the penstock pipes to six smaller branch pipes connecting to the outlet valves on each side. These pipes rest on reinforced concrete piers and are anchored at both ends, at bends and manifolds and in several intermediate areas.

The outlet works located downstream from the dam regulate the reservoir and supply water for flood control and downstream use before the generator capacity was sufficient. They have a designed capacity of 100,000 second-feet of water. At the present time the flow is 45,000 second-feet. The outlet works consist of the canyon wall outlet system and the tunnel plug system. The canyon wall system incorporates six 84-inch needle valves on each side of the canyon approximately 175 feet above the river and pointed 60^{0} downstream. The valves are housed in reinforced concrete structures of similar design: the Arizona house is 206 feet long, 36 feet wide, and 64.5 feet in height; the Nevada house is 190 feet long, 37 feet wide, and 64.5 feet in height. The valves are protected by 96-inch Paradox emergency gates connected to the steel outlet conduits entering through the back wall of the houses.

The tunnel plug outlet works are located in the inner diversion tunnels several hundred feet from their outlet portals. They are fed by 25-foot steel outlet pipes each leading to three 13-foot branch pipes, each of which in turn leads to two 86-inch pipes which feed a total of six 72-inch needle valves protected by 86-inch

emergency gates in each diversion tunnel.

The dam's powerplant consists of 17 turbines with a rated capacity of 1,850,000 horsepower with an additional 7,000 horsepower provided by the two service station units. The main turbines were installed, each of which is equipped with a butterfly-type hydraulic-rotor-operated shut-off valve at the inlet, a 10 to 14 foot-diameter turbine casing and is of the vertical shaft, single-runner Francis type with cast-steel spiral casings and single-piece cast-steel runners. The initial installation was composed of four 115,000-horsepower units and one 55,000-horsepower unit. These generators became operational in 1936 and 1937. The generators are of two sizes: 82,500 KV-ampere, 180 r.p.m., 60-cycle, 16,500-volt generators; 40,000 KV-ampere, 257 r.p.m., 60-cycle, 13,800-volt generators of the conventional 2-guide-bearing type with thrust bearings on the top of the frame and a 50,000 KV-ampere and 90,000 KV. Inert-gas-filled outdoor type transformers with shielded windings provide either 55,000 kilovolt-amperes at 287,500 volts or 13,333 kilovolt amperes at 138,000 volts as well as 230,000 KV and 69,000 KV. The larger transformers are water-cooled. The powerplant is located immediately downstream from the dam and is composed in two wings each on one side of the river with offices, shops, operating and storage rooms built across the downstream face of the dam, forming a U-shaped structure 1,650 feet long, with wings each 650 feet long.

The dam is pierced with galleries at 50-foot horizontal intervals from the 575-foot altitude to the 957-foot altitude to provide for drainage and inspection. There are approximately 2 miles of galleries in the dam. Two elevator shafts drop from the dam crest to tile-lined galleries 528 feet down which lead downstream through the dam to the central portion of the powerhouse. In addition to the elevator shaft houses at the summit of the dam, there are two similar houses containing public restrooms. All four of these structures are decorated in art deco style, which is also used in the parapets of the intake towers. Sculpted bas-reliefs on the upsteam faces of the elevator and restroom houses depict symbolic representations of power, water storage, and other themes.

Radial and circumferential contraction joints divide the face of the dam into blocks ranging in size from 25 feet by 30 feet to 50 feet by 60 feet. These extend through the slot from its upsteam face to loops of 1-inch cooling pipes buried in the concrete of the dam at 5-foot vertical and 5-foot 9-inch horizontal intervals. These 1-inch pipes are arranged in coils running from the slot circumferentially to the canyon walls and returning to the slot. These cooling pipes extend more than 570 miles through the concrete of the dam.

A small 1,630 square-foot exhibit building was constructed in 1940 on the Nevada side of Hoover Dam. This building provided a small lobby and an 85-seat auditorium in which visitors could view the model of the Colorado River and listen to a 10-minute taped lecture. From January, 1942 to September, 1945 the exhibit building

and the dam were closed to the public and were used by the U.S. Army as a military command post.

To commemorate the engineering achievement, of building Hoover Dam, a memorial was placed by the dam. The principle part of the memorial is located on the Nevada side of the dam, close to the abutment. Rising from a black polished base is the flag pole, 142 feet high, flanked by two winged figures. These figures are believed to be the largest monumental bronzes ever cast in the United States. The casings are 30 feet high. The shells are 5/8-inch thick and contain more than four tons of statuary bronze.

The figures rest on a black diorite base. Surrounding the base is a terrazzo floor which is inlaid with a celestial map. This map shows the precise time and date that the dam was dedicated.

Prior to the building of the dam, the low-lying areas of Arizona and southern California were particularly vulnerable to the high water flows of the river. The river in times of flood carried immense quantities of sediment which deposited in irrigation canals and created serious problems of water delivery and maintenance. In the arid southwest, growing crops rapidly wither and die if irrigation water is withheld. So, the clogging of headworks and canals with sediment, preventing delivery of water to the fields of crops, constituted a major irrigation problem along the lower Colorado River.

The lower Colorado River, like other western desert rivers, usually has high water flows in late spring and early summer. During this time floods resulting from rapidly melting snows occurred frequently and caused great damage in the lower Colorado River basin each year. Allowing these high-water periods, the flows often dropped to only 3,000 to 4,000 cubic feet per second. These periods of low flow were infreqently interrupted by large flash floods from such tributaries as the San Juan, the Little Colorado, the Bill Williams and the Gila Rivers.

Levees had to be built and continuously repaired to protect the lowlands from flooding. In 1905, the river broke through levees in Imperial Valley, California and flooded the lowlands for 16 months. The Imperial Valley was inundated, railroad tracks and highways were washed away, and farms and agricultural lands destroyed. The Salton Sea, with an area of 490 square miles, was formed. Damages amounted to millions of dollars. In 1909, the Colorado River again broke through the levees and changed its course, causing extensive damage. From 1906 to 1924 a total of $10¼ million was spent on levee work along the lower Colorado River. For the period from 1950 through 1977 the dollar benefits from the Hoover Dam flood control operations have amounted to $184,000,000.